

DSP sec 6

$$x(n) = \frac{1}{N} \sum_{k=0}^{N-1} X(k) e^{j \frac{2\pi n k}{N}}$$

$$W_N^{-kn} = \left[\cdot \right]_{N \times N}$$

$$W_4^{-kn} = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & +j & -1 & -j \\ 1 & -1 & 1 & -1 \\ 1 & -j & -1 & +j \end{bmatrix}$$

EX $x(k) = \{6, 1-j, 0, 1+j\}$

① $N = 4$

② W_4^{-kn}

$$x(n) = \frac{1}{N} W_4^{-kn} X(k)$$

$$x(n) = \frac{1}{4} \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & +j & -1 & -j \\ 1 & -1 & 1 & -1 \\ 1 & -j & -1 & +j \end{bmatrix} \begin{bmatrix} 6 \\ 1-j \\ 0 \\ 1+j \end{bmatrix} = \begin{bmatrix} 2 \\ 2 \\ 1 \\ 1 \end{bmatrix}$$